it. The anal contains only two spines, unless the anterior short one has been removed in preparing the specimen. The pointed ventral reaches to the anus. The margin of the caudal is slightly concave, the angles rather acute, and the upper one projecting a very little.

The colours of the specimen are tolerably well preserved, and agree generally with the tints mentioned in the 'Histoire des Poissons.'

The scales of the back and sides are dark and show greenish tints, and each is sharply bordered by a dark purplish margin producing a regular meshwork: there are faint traces of a paler crescent on each scale within the marginal one. The under surface of the body, bounded by a line running from the axilla of the pectoral to the anal, is pale, each scale having also a pale margin, though of a different tint from the disc. There is a large circular violet-purple blotch behind the eye, a dark patch on the preorbitar, and some spots of campanula-purple on the preoperculum, suboperculum and interoperculum. The cheeks and operculum have a dull yellowish hue. The colours of the pectorals and ventrals are effaced, except that a dark mark remains on the base of the former. The dorsal and anal fins are imperial purple, which is bounded by a line of deep pansy-purple, the extreme border being pale. Many dots of pansy-purple are spread over both fins, being roundish on the anal and oblong on the soft dorsal; a few larger drops extend to the pale border of the anal, and the scales on the base of the fins are edged with emerald-green. The caudal is purplish without spots, its edge being pale.

Dimensions.	inches.	lines.
Length from upper teeth to end of caudal	13	6
——— base of caudal	11	3
——— anus	6	9
——— dorsal	4	9½
——— ventrals	4	6
——— pectorals	4	2
——— end of lobe of gill-cover	4	3
——— orbit	2	3
Diameter of eye	0	7
Height of body	3	6

[To be continued.]

L.—*Observations on the Growth, Reproduction, and Species of the Branched Freshwater Confervæ.* By Arthur Hill Hassall, Esq.

In a paper read before the Natural History Society of Dublin, a portion of which was inserted in the 'Annals,' vol. ix. p. 431. allusion was made to the principal mode of growth of the freshwater Confervæ, viz. by the continued growth and bisection of all the cells entering into the formation of the filaments. I come now to notice a second mode of development,

scarcely less interesting and important as regards the classification of Confervæ than the former.

In many species of Confervæ, more especially amongst the branched kinds, there is not only a longitudinal development of the cells, but there is likewise a lateral growth of them, so that if we examine any species in which this law is known to exist, we shall observe, first, that the filaments differ considerably in diameter in the same specimen; secondly, that the largest filaments are near the centre of the specimen; and thirdly, that the diameter of all the filaments, whether these be near the centre or circumference, gradually decreases from base to apex; the observation of these three things proving the existence of the law of lateral development of the cells, and also showing it to be in proportion to their age. The proportions of a specimen of branched Conferva are therefore, in miniature, those of a tree or shrub.

I have observed this law of growth to exist in the following Confervæ: in the Vesiculasperms, many *Diatomaceæ*, and in *Conferva zonata*, the filaments of all of which are simple; in the Batrachiosperms, the genera *Draparnaldia* and *Chætophora*, in *Conferva glomerata*, *C. crispata*, *C. flavescens*, and in *C. ægagropila*, in all of which the filaments are branched. It has no existence in the Conjugating Confervæ, in many *Oscillatoriæ*, in some of the species of the genus *Desmidium*, and in the genus *Bulbochæte*, all of which, save the last, have simple filaments, whose diameter does not vary with age, but is the same in the immature and mature condition of the species.

These laws of the lateral development of cells prevail doubtless likewise amongst the majority of the marine ramose Confervæ, and it is important that it should be kept in view in the framing of genera.

The *reproduction* of the branched Confervæ, whether marine or freshwater (for I believe it to be the same in both) is still shrouded in much obscurity, but certainly differs essentially, if we except the genus *Bulbochæte*, from that of the Confervæ with simple unbranched filaments, the Synspores of M. Decaisne, and the Vesiculasperms; for in them there is no intermingling or union of the contents of the adjacent cells, either in the same or different filaments, and no formation of a true spore; but there is, as in the Vesiculasperms, an inflation of the reproductive cells, which inflation is produced by an increase in the size of the small sporular granules, some twenty, thirty or more of which are contained within each cell. The determining cause whereby this increase of the granules is produced is at present a mystery, the solution of which is much to be desired. The inflation of the reproductive cells of

the branched Confervæ does not appear to have been noticed, so far as I am aware, by any other observer save Vaucher, and by him only in the Batrachiosperms, and yet it is of frequent occurrence, and affords a character whereby often species may be distinguished from each other, although at the same time it changes the ordinary appearance of species so much as to lead sometimes to the description of specimens so altered as distinct species; and this has doubtless been the case with *Conferva fracta* of the 'Flora Danica,' which I take to be nothing more than *C. crispata* in a state of reproduction.

It is then by means of the small granules to which reference has been made, which, although they have undergone a considerable increase in size, are not one-twentieth part so large as the true spores of the *Conjugatæ* and of the Vesiculasperms, that the branched Confervæ are perpetuated; and hence we see the necessity and wisdom of the law of lateral growth to these Confervæ, which otherwise would be placed amongst the most minute objects of creation.

And it is, therefore, amongst the branched freshwater Confervæ that we are principally to look for members of the once apparently important class of Zoospores. If there be such things, and it can scarcely be doubted but there are, it is here that they will chiefly be found. I have myself tried to detect motion of the reproductive granules, (which motion, by the way, is no conclusive proof of animality,) and once only in *Conferva glomerata* did I observe any motion of bodies within the cells; and these might possibly have been small animalculæ which had effected an entrance through the aperture said to be provided for the escape of the zoospores, which aperture I have observed only in *Conferva glomerata,* in which it invariably occupies a determinate situation at one side of the upper extremity of each cell; a fact in itself so strong, as in my opinion at once to throw discredit upon the explanation of Agardh as to the manner of the formation of the aperture, viz. by the reiterated pulsations or knocking of the confined zoospores against the sides of the walls of the cells.

The freshwater species of the branched Confervæ appear to me to resolve themselves into the following genera, the whole of which, including the genus *Bulbochæte,* appear to form an exceedingly natural group, which I propose to designate Microsperms. *First,* into the genus *Bulbochæte,* which may be thus defined:—

Genus Bulbochæte.

Filaments attached, of equal diameter, branched; cells truncate, setigerous, the setæ being rigid, elongated and bulbous

at their bases; reproductive bodies situated either in inflated cells, when they are formed by the union of the contents of true contiguous cells, or in the bulbous portion of the setæ, which becomes much enlarged for their accommodation.

The reproduction of this remarkable genus has until very recently been wholly unknown. M. Decaisne, in his memoir on the Classification of the Algæ, contained in the numbers of the 'Ann. des Sciences Nat.,' for May and June 1842, alludes to the mode of formation of the reproductive bodies by the union of the matter of true cells in the same filament, but does not appear to have noticed the second way in which they are formed, viz. within the bulbous portion of the tube. The observations of M. Decaisne and my own remarks appear to have been made nearly at the same period.

In the above account of the reproduction of the genus *Bulbochæte* I have avoided using the term spore to designate the condensed endochrome in the inflated cells which presents so much the appearance of a true spore, for I conceive that it is most probable that this separates, as in the other branched species of Confervæ, into numerous small reproductive granules.

The genus *Bulbochæte* may be regarded as forming the connecting link between the simple and branched freshwater Confervæ; it agreeing with the *Conjugatæ* in the equality of its filaments, with the Vesiculasperms in the union of the contents of two distinct cells, and probably with the branched species in the separation of the condensed endochrome in the inflated cells into numerous reproductive vesicles.

But one species of this genus is described by British authors. There are however, I suspect, not less than three or four distinct species, which I would characterize as follows, refraining for the present from naming them, in the hope of having further opportunities of examining them.

1st sp. *Bulbochæte setigera.* Cells usually five times as long as broad.

This I regard as the most common species of the genus, and I have met with it in very great abundance in ponds on Hertford Heath, High Beach, Cheshunt Common, as well as other places.

2nd sp. Cells usually three or three and a half times as long as broad; reproductive bodies formed by the union of the contents of two adjacent cells, in one of which they are contained.

3rd sp. Cells usually once and a half as long as broad; reproductive bodies placed within the bulbs of the setæ, which become much enlarged for their accommodation.

4th sp. Filaments very minute; cells usually four or five times as long as broad.

The filaments in this are not one-third so large as those of the preceding species.

Secondly, into the three well-known and intimately allied genera *Batrachiospermum, Draparnaldia* and *Chætophora,* which resemble in their mode of growth as well as in their reproduction the branched Confervæ of the following genus.

Thirdly, into the genus *Microspora.*

Nov. gen. Microspora.

Char. Frond attached, branched, filaments tapering and of various diameter according to their age; reproduction consisting of minute vesicles, several of which are placed in each inflated cell.

This important genus contains the following species, *Conferva glomerata, C. crispata, C. flavescens, C. agægropila, C. Brownii,* and most probably the majority of the marine branched Confervæ usually associated with the genus *Conferva,* as well as many of the unbranched marine species.

I have omitted enumerating *Conferva fracta* and *C. nigricans* as belonging to this genus, for I regard the first, as already stated, to be *Conferva crispata* in a state of reproduction; and the latter I strongly suspect to be some aquatic production, probably a *Chara* in a state of decay, of which I found a considerable quantity on a recent visit to Wimbledon Common, the locality from which Mr. Dixon [Dickson?] obtained his specimens, presenting much the appearance of a Conferva.

Fourthly and *fifthly,* into two genera characterized as below, but which I shall leave for the present unnamed.

1st genus. Filaments very sparingly branched, slightly contracted at the joints; endochrome rarely filling the cells.

There is but one species which I am at present able to refer to this genus, the *Conferva ericetorum* of Roth, a plant which, in common with some other observers, I was long inclined to regard as a *Conjugata* and a member of the genus *Mougeotia*; however, the occasional presence of short branchlets seems inconsistent with this opinion.

2nd gen. Filaments nearly equal, dichotomously branched; endochrome contained in a small tube which passes through the cells in a waved manner.

Species. Filaments slender, attached, tufted, about three-fourths of an inch in height; cells usually about seven times as long as broad, slightly contracted at the joints; endochrome black, contained in a small tube which passes through the cells in a waved manner.

It is not at all easy to make out the structure of this production, unless it be immersed in a solution of iodine, owing to the extreme transparency of the filaments, the dark colouring matter being situated only in the narrow thread which passes up the filaments. To the unassisted sight the filaments are of a blackish-gray colour.

Acton Green, Middlesex: several specimens.

LI.—*On some new Insects from Western Africa.* By the Rev. F. W. Hope, F.R.S., F.L.S.

[Continued from vol. x. p. 95.]

To the Editors of the Annals of Natural History.

Gentlemen,

From illness I have not until now been able to continue the description of the new insects received from Western Africa. Those described at present are remarkable for beauty and richness of colouring, and exhibit all the splendour so peculiar to tropical regions. From the Rev. Mr. Savage I have lately received some additional observations respecting the Goliath Beetles, which it is my intention to transmit to you on a future occasion. In haste,

I remain, yours very sincerely,

February 22, 1843. F. W. Hope.

Sp. 35. *Hydaticus discoidalis*, Hope. Long. lin. $5\frac{1}{2}$; lat. lin. 3. Affinis *Hydat. dorsigero*, Dupont, at minor. Oblongo-ovalis, thorace obscure testaceo, suturali parte elytrorum nigra lateribus testaceis, punctis minutisque per discum aspersis, corpore infra ferrugineo, pedibus concoloribus.

Sp. 36. *Hydrous rufofemoratus*. Long. lin. 11; lat. lin. 5. Niger, palpis rufo-testaceis, thorace glabro, elytrisque quibusdam lineis punctato-striatis, punctis parum distinctis. Corpus infra atrum, femoribus rubris, tibiis nigricantibus nitidis.

Hab. Circa Palmas.

Sp. 37. *Hydrous distinctus*. Long. lin. 9; lat. lin. 4. Niger, forma ovali elongata, palpis rufo-testaceis. Elytra glabra punctis haud sub lente distinguendis. Corpus infra obscure atrum et subtomentosum, femoribus tibiisque nigris et nitidis.

Hab. in Sierra Leona.

There are two other species undescribed in the same collection